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Recent trends in microbial flora of chronic otitis media

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ABSTRACT

Introduction: Aim of this study is to identify the microbes causing active mucosal Chronic otitis media (COM) and to know sensitivity pattern in this group.

Materials and method:

Pus swabs were collected using sterile swabs and sent to microbiology laboratory to be cultured immediately. Antibiotic susceptibility was assessed with Kirby-Bauer disc diffusion method.

Results:

The most common microbes isolated were Staphylococcus aureus followed by Pseudomonas aeruginosa. The most effective antibiotic against Staphylococcus aureus is linezolid and for Pseudomonas aeruginosa is piperacillin-tazobactam.

Discussion:

Pseudomonas aeruginosa followed by Staphylococcus aureus is the common known bacteria isolated but in our study staphylococcus aureus followed by pseudomonas aeruginosa was the common isolate. Our empirical antibiotic policy is oral erythromycin with topical ofloxacin.

Conclusion:

The trends in antibiotic policy have to be reviewed from time to time, to see the changing susceptibility pattern of the bacteria.

Introduction:

Chronic otitis media (COM) is defined as chronic inflammation of middle ear and mastoid cavity which presents with hearing loss and ear discharge. COM is classified into active mucosal, inactive mucosal, active squamous and inactive squamous type. Chronic otitis media- active mucosal type is a treatable condition which limits the quality of life. Management of active mucosal COM starts with medical management with an appropriate antibiotic followed by surgical management. Successful management gives the patient a normal hearing and dry ear. Success of surgery depends on appropriate antibiotic cover during the perioperative period. The microbial pattern of COM varies from place to place. Also with increasing use of antibiotics, the antibiotic sensitivity is constantly changing. Awareness about this is a must to start appropriate antibiotic therapy. As culture takes two days, starting the antibiotic empirically after taking culture is the common practice. Aim of this study is to identify the microbes causing active mucosal COM and to know antibiotic sensitivity pattern in this group.

Materials and Methods:

This prospective study was conducted from 2013-2015 after obtaining ethical committee approval. All patients attending our outpatient department with ear discharge for more than 3 months and central perforation of tympanic membrane were included in this study. Patients who had taken systemic or topical antibiotic during the past four weeks were excluded from the study. Also patients with cholesteatoma and otitis externa were excluded from the study. About 176 patients were included in this study.

Sterile swab was used to collect pus from the ear and was sent to microbiology laboratory immediately. Pus swabs were cultured with blood, chocolate and MacConkeys agar. Antibiotic susceptibility was assessed with Kirby-Bauer disc diffusion method.

Results:

This study included 176 patients. Out of this 104 patients were male and 72 patients were female. 32 patients were under 18 years of age and the rest were 18 years or above.

Out of the 176 samples, 128 samples were positive for the bacteria. The antibiotic sensitivity pattern of these bacteria was identified. Staphylococcus aureus was isolated in 48 samples and Pseudomonas aeruginosa in 42 samples. Enterobacter species, Escherichia coli, Providencia species, Coagulase negative staphylococcus, Streptococci species, Citrobacter freundii, Klebsiella pneumoniae, Proteus mirabilis, Haemophilus species and Acinetobacter species were the other bacteria isolated (Fig. 1). Out of this no aerobic organism could be identified in 36 patients and 12 culture showed fungus.

The most effective antibiotic against Staphylococcus aureus as shown in fig. 2 was linezolid(100%) followed by vancomycin(95.8%) , erythromycin(87.5%), clindamycin(87.5%), methicillin (87.5%), cephalexin(79.2%), co-trimoxazole(70.8%), ofloxacin(62.5%), ciprofloxacin(62.5%) and penicillin(37.5%). Methicillin resistant Staphylococcus aureus was identified in 6 out of the 48 Staphylococcus aureus isolated.

The antimicrobial sensitivity pattern for Pseudomonas aeruginosa as shown in fig. 3 shows maximum sensitivity to piperacillin-tazobactam(100%) followed by amikacin(90.5%), cefoperazone-sulbactam(90.5%), ofloxacin(90%), ciprofloxacin (85.7%), gentamicin(76.2%), ceftazidime(76.2%) and cefepime(66.7%).

Among the other microbes as per the like Escherichia coli, Enterobacter species, Klebsiella, Citrobacter etc the most effective antibiotic was amikacin, linezolid, clindamycin, vancomycin and cefoperazone- sulbactam (fig. 4).

Discussion:

COM is a curable condition which causes severe limitation to the patient's quality of life. Identification of microbes that cause this and their antibiotic sensitivity helps the ENT surgeon to treat this condition in the best way.

Collection of pus using ear swabs from middle ear via external auditory canal under microscope is a reliable method in obtaining specimen.[1] We followed the same method to obtain pus.

Pseudomonas aeruginosa followed by Staphylococcus aureus is the common known bacteria isolated from COM. [2,3,4] In our study we found staphylococcus aureus followed by Pseudomonas aeruginosa as common isolate in COM. Similar results were noted in study conducted by Agrawal (2013).[5] There is a slow change in the bacteriology pattern of COM. Fungus was identified in 12(7%) out of 176 specimens collected. Candida and Aspergillus are the common fungus identified. In the study conducted by Prakash(2013) the fungus was isolated in 25% of samples.[6] In the present study most effective antibiotic against Staphylococcus aureus is linezolid(100%) followed by vancomycin (95.8%), erythromycin(87.5%), clindamycin(87.5%), methicillin (87.5%), cephalexin(79.2%), co-trimoxazole(70.8%), ofloxacin(62.5%), ciprofloxacin(62.5%) and penicillin(37.5%).

The study conducted by Agarwal(2013) showed 38.3% sensitivity with ampicillin, 55.3% with ciprofloxacin and 61.7% to macrolides. In Nazir's(2014) study vancomycin was the most efficient antibiotic against Staphylococcus aureus.[7] In Madana (2011) study sensitivity of Staphylococcus aureus was maximum to vancomycin followed by ciprofloxacin and erythromycin.[8] The first line treatment for Staphylococcus is penicillin group and macrolides. The sensitivity of Staphylococcus aureus to penicillin group is reducing and that for erythromycin is good. Hence it could be used for starting empirical antibiotic for gram positive cocci before the culture report arrives.

The antimicrobial sensitivity pattern for Pseudomonas aeruginosa shows maximum sensitivity to piperacillin-tazobactam(100%) followed by amikacin(90.5%), cefoperazone-sulbactam(90.5%), ofloxacin(90%), ciprofloxacin(85.7%), gentamicin(76.2%), ceftazidime (76.2%) and cefepime(66.7%). In Nazir's (2014) study amikacin followed by imipenem and piperacillin-tazobactam was the most effective antibiotic against Pseudomonas aeruginosa.[7] Ceftazidime followed by ciprofloxacin and amikacin is the most sensitive antibiotic for Pseudomonas in Madana (2011) study.8 For Pseudomonas, quinolones would be a good option. As quinolones are available for topical use, ofloxacin ear drops can be started empirically for all gram negative bacilli.

For microbes like Escherichia coli, Enterobacter species, Klebsiella and Citrobacter most efficient drug was amikacin followed by linezolid, clindamycin, vancomycin and cefoperazone- sulbactam.

Empirical treatment for active mucosal COM is with antibiotics which cover Pseudomonas aeruginosa and Staphylococcus aureus. Empirical antibiotic is to be started before gram staining and arrival of culture report. This should have good susceptibility to both gram positive cocci and gram negative bacilli. Hence our empirical antibiotic policy is oral erythromycin with topical ofloxacin.

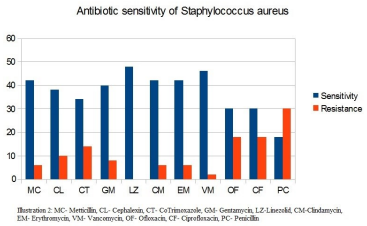

Figure 2

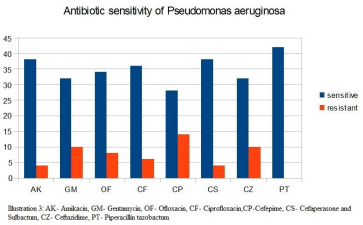

Figure 3

Conclusion:

Microbial pattern and antibiotic sensitivity of COM is constantly changing. Awareness about this is a must for the effective management of COM active mucosal type. That is why the trends in antibiotic policy have to be reviewed from time to time, to see the changing susceptibility pattern of the bacteria.

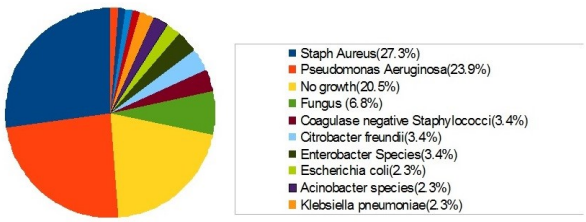

Figure 1

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